

1 of our first panel, David Gabel.

2 I think the introductions are pretty much in our
3 panel, so perhaps we can just move right into the
4 presentations.

5 David.

6 Panel Presentation I - Data Gathering Initiatives

7 DOCTOR DAVID GABEL: Good morning, and thank you
8 for having me here.

9 At the outset, I need to point out that the
10 research that I'm going to be reporting here is done jointly
11 with Florence Kwan, who is also here in the audience.

12 What you're going to hear this morning are a few
13 different presentations.

14 Myself, I'm going to be providing the results of a
15 study that looked at the availability of broadband service
16 throughout the United States.

17 You'll also be hearing discussions, talking at a
18 more focused level, at a state level. Also, there will be a
19 discussion this morning about what's the cost of providing
20 access to the internet at a rapid, fast speed.

21 So we sort of, I think, have three types of talks
22 you're going to hear. What's going on at the national
23 level, more focused state level, and then what's the cost
24 involved in rolling out high-speed access to the internet.

25 I just want to start with a map or two to

1 illustrate why I or Florence and I chose the approach to
2 this question the way we did.

3 One could say that broadband service is available
4 in New York City. Here is the Island of Manhattan. And I
5 know it's a little bit hard to see the colors, but
6 essentially when you look at Manhattan, service is only
7 available in the mid 50s on the East Side, mid 50s on the
8 West Side, and then also down around 12th Street.

9 So to say that service is available in Manhattan
10 is a correct statement, but it really misses the important
11 point that investors have to make decisions about where to
12 first roll out the service.

13 And so looking at this map of Manhattan, or if I
14 can, the next map of Queens, I asked myself, well, why did
15 firms, such as in this case, I think it's TCI, decide to
16 roll out service in particular neighborhoods first?

17 And for those of you who are familiar with New
18 York, you'd probably say it's a no brainer here, because if
19 you look up at the top in Flushing and Little Neck, well,
20 that's the wealthy area of Queens; and if you look in the
21 bottom yellow, the area of Queens which is going to get
22 service last, that's the low-income area.

23 So it seems to be not surprisingly driven by
24 targeting the service to areas that have higher incomes.

25 Well, that's our intuition. And I wanted to rely

1 on my intuition when I undertook, or Florence and I
2 undertook this study to try to model the roll out of
3 high-speed access to the internet in the United States.

4 And what we did was contact some people who are
5 involved in actually making these investment decisions.

6 So, for example, we talked to the firm STRAT Soft
7 and also some xDSL providers, and said what criteria did you
8 use in deciding where to first roll out access to the
9 internet.

10 And based on these conversations, not
11 surprisingly, we learned that some of the factors were not
12 only income, the number of business customers in a
13 particular community.

14 Also, what I learned from it were there were
15 things like how far the customer is from the internet
16 backbone?

17 Now, there's two reasons for that. One, is the
18 issue that the Senator already mentioned, and that is that
19 there's the transport cost.

20 The second is, the more hops you have to make in
21 order to reach the internet backbone, the lower the quality
22 of service.

23 So we wanted to develop a model that would reflect
24 not only the demographics and economic conditions in a
25 particular market, but also supply side considerations, such

1 as how far a customer is from the internet backbone and how
2 that affects the cost of providing access.

3 And, finally, on that note, we wanted to take into
4 account that, because of the cost structure of this
5 industry, there are large fixed costs; consequently the
6 higher the population density or, more importantly, the
7 higher the telecommunication density in the market, the
8 greater the likelihood that neighborhood would first receive
9 service.

10 So what we did was, went out and collected data.
11 It's a representative sample for the United States and we
12 found out is service available or not available at a
13 particular address?

14 We looked at both xDSL and Cable Modem Service.

15 And so now I'd like to just turn to -- I want to
16 show you what turns up descriptive statistics. I'm going to
17 run through three tables with you.

18 The first finding is that, not surprisingly, that
19 the availability is a function of telecommunications density
20 income and rates.

21 Now, this is just what we call descriptive
22 statistics. I'm not controlling for everything at once.
23 I'm just saying, as you'll see in the subsequent table, that
24 if you're in high, densely populated area, there's a greater
25 likelihood of you having access to the internet at a high

1 speed. If you're in a wealthy area, the same holds. And,
2 finally, if you're in an area dominated by white households,
3 there's a greater likelihood that you're going to have
4 access to the internet at a high speed.

5 In the tables that we're going to run through,
6 what we're measuring, do you have access or not? If you
7 have access, there's a value of zero in the table. If you
8 -- I'm sorry, if you do not have access, there'll be a
9 value of zero. If you do have access, there's a value of
10 one.

11 The first table reports that in areas in which the
12 telephone line density is less than 50 lines per square
13 mile, 98 percent of the subscribers cannot obtain DSL or
14 cable modem service. So the survey shows what one would
15 expect. The service is not available in rural areas of the
16 United States.

17 The second table reports that access to high-speed
18 cable modems or DSL does not increase monotonically with
19 income. And this is due to supply side considerations. And
20 that is that poor people are often concentrated in cities
21 and in the cities we have wire centers that have a large
22 number of subscribers. So when somebody is trying to decide
23 where they're going to deploy xDSL services, they often
24 target wire centers, where you can reach a large number of
25 customers.

1 So we'll see in one of the tables that it isn't
2 always the case that deployment always increases with
3 income, but it generally does.

4 And, finally, the third table reports that an area
5 with a high concentration of nonwhite householders are less
6 likely to be offered high-speed access to the internet than
7 areas with a high concentration of white householders.

8 Now, on that bullet, I want you to keep in mind
9 that I'm not going to be claiming that there's any redlining
10 here, because once we move to the next set of slides, which
11 involve doing a statistical analysis using regression
12 techniques, we're going to see that there's no statistical
13 evidence of redlining.

14 So let me just quickly run through the tables with
15 you.

16 Here, the top row says: What if a customer lives
17 in an area where the number of telephone lines per square
18 mile is between zero and 50? That's the first column.

19 And it says that in my sample I had 41 customers
20 in this national sample that satisfied this criteria and did
21 not have access to the internet at a high speed, and I had
22 one area in the nation where the density is less than
23 50 lines per square mile, and that one customer had access
24 to the internet at high speed.

25 So looking in a rural area, you see 97.62 do not

1 have access at a high speed and 2 percent do.

2 And then going to the other extreme, where the
3 tele density is up in the range of 140,000 lines per square
4 mile, you see everyone has access to the internet at a high
5 speed.

6 Yes, one minute. Okay.

7 Well, since we have only one minute left, let me
8 just move through, all the way to the end, we'll go past
9 that, past that, past that.

10 All right. I then did a statistical analysis,
11 where I was running a regression, where I'm saying, well,
12 there's lots of things that affect a decision to deploy
13 high-speed access to the internet. And I want to control
14 for all of the factors.

15 And the factors are tele density, is the service
16 territory served by a regional Bell operating company?

17 I thought that this was an important variable to
18 include, because, as you know, Congress is concerning
19 relaxing the restriction on RBOC providing interlarder
20 (phonetic) data service. And I want to know if a customer
21 resides in a territory served by an RBOC, is there a lower
22 likelihood that those customers have access to the internet
23 at a high speed because of the 271 restriction?

24 Then I have factors controlling for race, income,
25 how new is the housing stock, and estimated minimum distance

1 to the internet backbone.

2 And since I'm out of time, we won't look at the
3 charts, we'll just go to the very last slide, where I
4 summarize the results.

5 And that is availability of high-speed access
6 increases with telecommunications density and income, which
7 is what you would expect, so the results from the sample are
8 consistent with your intuition.

9 Rate turns out to not to be a factor in the
10 deployment of access to high-speed networks, and that is
11 because after you control for income, the factor of rate
12 that shows up in the on table disappears. So my conclusion
13 is there's no evidence of redlining in this industry at this
14 point in time.

15 And then, lastly, the data analysis indicates the
16 customers served by regional Bell operating companies, all
17 else being equal, that means I'm controlling for tele
18 density, I'm controlling for income, I'm controlling for the
19 age of the neighborhood, have the same opportunity to
20 subscribe to high-speed internet service as customers served
21 by non-RBOC.

22 In fact, the one most, to me, most intriguing
23 thing for policy makers to consider, is there's two
24 companies that are sort of outliers with the RBOC.

25 One is Bell Atlantic. Bell Atlantic subscribers

1 have a higher likelihood of having high-speed access to the
2 internet than subscribers in other areas of the nation.

3 And one possible way of interpreting that, and
4 people can argue about how to interpret it, I'm just going
5 to give you, first, the statistical result, which I already
6 have.

7 But one way of interpreting this, is that Bell
8 Atlantic has been on the frontier of opening up their
9 network.

10 That's why the FCC granted them the 271 approval
11 in the State of New York; and coinciding with that, because
12 perhaps they're opening up their network the fastest, that's
13 why we see there being a greater likelihood of high-speed
14 access to the internet in the Bell Atlantic territory than
15 in other areas of the nation.

16 I said there was two RBOCs. The other was U.S.
17 West. U.S. West statistically is just right on the cusp of
18 being statistically significantly different than other
19 telephone companies, and they, too, seem to be rolling out
20 service.

21 Not only U.S. West, but everybody in the U.S. West
22 territory seems to be providing the service to customers at
23 a faster pace than in other areas of the nation.

24 So those are my findings, the best I can, in five
25 minutes.

1 And thank you.

2 (Applause.)

3 DOCTOR WILLIAM LEHR: Hi, I'm Bill Lehr, and as
4 with the remarks of David Gabel, the work I'm going to be
5 talking about today is actually work that's joint of a
6 number of folks, Sharon Gillette, who is also here in the
7 front row; and a bunch of work with a bunch of the slides
8 that I would have shown you if you'd allowed me to bore you
9 for a lot longer than five minutes, was due to folks at the
10 Massachusetts Technology Collaborative. So hopefully you'll
11 get another chance to hear about and help from folks at the
12 Massachusetts Software Council.

13 Go to the next slide.

14 I'm working with the MIT Internet & Telcomm's
15 Conversion Consortium, and the basic idea of this consortium
16 is that we're interested in thinking about, if you took the
17 vision what an internet is going to be, if you really think
18 of it, it could be the platform for our communications
19 infrastructure in the future.

20 If that's really going to happen, then a lot of
21 things have to change.

22 Give me the next slide.

23 So one of the areas, of course, is broadband,
24 because we really view broadband access, and a broadband
25 internet is really what a vision of the true internet and

1 all these wonderful services entails.

2 Otherwise we think that this whole, you know, talk
3 about electronic commerce, streaming media, all these sorts
4 of wonderful things, distance education, all these things
5 are going to grind to a halt for lack of available capacity.

6 When we think about broadband research, we think
7 about it in a number of different ways. And I was heartened
8 to hear the comments of Commissioner Powell mentioning, you
9 know, there's a whole lot of things we need to be looking at
10 here.

11 Availability of the service and where it's being
12 deployed is one question, but it's certainly not the only
13 question.

14 We understood at MIT, in looking at the technology
15 we got a couple of technology projects that are
16 investigating such things as what happens if you try and
17 provide really high-speed wireless access in particular
18 locations.

19 We're also looking at the some of the implications
20 of what happens when you start aggregating this traffic of a
21 very different type than telecommunications carriers have
22 been accustomed to handling in the past.

23 We've also done some work on cross modeling.
24 We've done some work on modeling local access deployment
25 costs under a number of different technologies and we're

1 just now in the process of trying to see whether you can
2 look across technology and learn some interesting things.

3 We also have some work that's going on looking at
4 what it might cost if you were going to try to unbundle
5 cable modems, using one of the better technologies.

6 I'm not going to be talking about any of that
7 work. What I'm going to be talking about today is our work
8 in industry structure and availability of residential
9 broadband access in the U.S.

10 Next slide.

11 As I said before, if you think about broadband
12 residential access, and you believe that the internet is
13 going for structure for the future, then really meaningful
14 competition is going to mean, in the last mile, it's going
15 to mean competition amongst broadband internet access
16 options.

17 And so, for example, looking at the availability
18 of dial-up internet access, while very important today, is
19 really not what competition in this industry is going to
20 mean in the future.

21 Next slide.

22 So first there's a question of what is broadband
23 and what are you going to look at?

24 Well, that's really a hard question. There's a
25 lot of different services out there, and the services are

1 changing over time, and we don't really know where exactly
2 market is going to go.

3 And the one thing about the internet is that the
4 internet is not what you thought it was going to be. The
5 whole idea of the internet is the internet enables the
6 possibility of things, so that we don't have to depend on,
7 oh, you only wanted to make real time, point-to-point to
8 telephone communications. No? You can do whatever you want
9 to do. That's the idea.

10 So what is broadband?

11 Well, it's better than what we can get from
12 dial-up. That's a good working definition right now, for at
13 least of view, for collecting data.

14 What researchers said, let's not think about ISDN,
15 although ISDN is important, let's not think about that as
16 broadband, and let's not also think about the satellite
17 services that use a dial-up or turn channel, direct PC, as
18 broadband, although there are reasonable arguments as to why
19 that might be worth considering.

20 The research we started, we looked in the fall of
21 1998, and we said, what's broadband?

22 Well, DSL, there weren't really no DSL deployment
23 at the time.

24 So if you're going to look at what was actually
25 getting deployed, that meant looking at cable modems.

1 A direct key (phonetic) feature that's really not
2 intrinsic to broadband, but really has a lot to do with the
3 way in which these services will change the way people use
4 the internet and what they need is all reborn.

5 And, in effect, you don't really have to have
6 broadband services, but that's a really key feature.

7 The next characteristic is bandwidth needs. And
8 here you can get into all kinds debates, questions about
9 whether or not you need higher bandwidth in the downstream
10 channel than you need in the upstream channel. It's really
11 a question of what applications you're running.

12 There's also a question of, are you talking about
13 peak versus average?

14 You know, what people really want to do on the
15 internet is they want to be able to burst at very high data
16 rates, but most of the time, they're not actually putting
17 traffic on the internet. And that is implications for how
18 you actually provision this.

19 And there's questions of what kind of applications
20 are being provided, and there are also what sorts of
21 services are supported?

22 Are you allowed -- when you get broadband access,
23 if you're a person who is running a small business, are you
24 allowed to put a server on your broadband connection?

25 Some broadband providers will allow you to do

1 that, others won't.

2 Those of you that have been following the news,
3 NAPSTER is this program that allows people to swap music.
4 Now, that's probably going to run into problems with
5 intellectual property before it runs into bandwidth
6 problems, but that caused a lot of problems for folks on the
7 internet. In some ways, it's a logical conclusion of where
8 the technology was going. So it's proposing a real
9 interesting problem for the industry.

10 Next slide.

11 Okay. So I was given some questions that said,
12 what are you really interested in?

13 So I nearly tore up most of my presentation and
14 then tried to answer those.

15 So some of these are things that we already heard
16 about from day to day, but they reflect back to research we
17 did in looking at where deployments were as of mid 1999.

18 There's another fact, is TV affecting decisions
19 people make?

20 The first, obviously, you think from a cost
21 perspective. Population density is one of the most
22 important.

23 Now, when you look at demographic data, what you
24 find is that highly dense areas also tend to have the
25 largely populated areas, and also tend to be -- have high

1 per capita income. All these things are closely related and
2 go together.

3 The second key characteristic for cable is you
4 have to look, how is cable going through a two-way upgrade?

5 In other words, have they taken out the one-way
6 amplifiers that cable television networks used to have and
7 put in two-way amplifiers?

8 And a lot of places started doing this way back
9 when, a number of years ago, before they thought they were
10 going to go into the internet.

11 So a lot of what you see in terms of deployment is
12 a result of decisions that were made sort of pre-internet
13 age.

14 If you're thinking about the self-services, then
15 you have to worry about things like how far away are you
16 from the central office and what kinds of other technologies
17 are there between the central office and the home?

18 Digital loop carrier is a way in which they use to
19 economize on transmission, and it's not a single type
20 technology. There's many different types of digital loop
21 carrier and it tends to be -- it's going to be a big issue
22 in terms of looking at what happens with DSL.

23 There's also questions about you're adjacent to a
24 broadband serving area. You know, if you're a poor
25 community next door to a rich community that got the

1 service, then you're more likely to get the service, too,
2 because it's easier to roll it out that way.

3 If you think about it in terms of demand, again,
4 density and per capita income and population are all factors
5 that are displaying why they're located in particular areas.

6 Those tend, also, to be related. The high-income
7 areas, areas with highly educated folks are also areas where
8 people are much more likely to own PCs, are more likely to
9 have a higher willingness to pay, and internet access is
10 much more prevalent.

11 At least at this stage, you certainly see a very
12 strong effect in terms of who are you looking at? And this
13 is more true about cable, perhaps, than DSL services, and I
14 have not really looked at sort of differences across the
15 RBOC, so I'm very interested in taking a closer look at
16 David Gabel's results.

17 But from the cable carrier, you see people like
18 MediaOne, that were very aggressive in updating their
19 network, were in a much better position and were really
20 leaders in terms of deploying cable modem services over
21 their facilities.

22 And so, for example, in most areas of
23 Massachusetts -- I live in Concord, I don't happen to live
24 in one of those areas -- where MediaOne is your provider,
25 you're more likely in similar types of communities around

1 the United States to have cable modem access.

2 PCI historically had not made as many of those
3 upgrades and so there's a share of their network, they're
4 behind, although they're trying to catch up now.

5 In terms of competition, when you look at the
6 competition, the question is -- one of the questions in our
7 analysis was, are they trying to carve up the territory or
8 are they actively trying to compete?

9 We see no evidence in the data right now that they
10 appear to be carving up the territory. In other words, you
11 know, the modem guys have the nice Community A, so the DSL
12 guys will grab the Community B, and we won't actually see
13 competition between the two services.

14 In fact, it doesn't look like that's what's
15 happening, but it's still too early to tell.

16 The other question, you really have to think
17 about, are we talking about business versus residential
18 services? DSL, to the extent it got an early rush, and
19 especially from the CLEG -- from the noncarriers, has been
20 focused initially on more business type service offerings,
21 whereas the cable modem is essential residential offering,
22 although that's a little different when you get away from
23 the major metropolitan areas.

24 Next slide.

25 For broadband to deployment in the U.S., these are

1 the numbers, what we know -- this is from a bunch of
2 different, various industry statistics, trade, press,
3 analysts reports. It's a snapshot in time.

4 Essentially, there's about 2.4-million
5 subscribers, from Connet (phonetic) Strategies, out of
6 something like 67-million cable subscribers, or 3.6 percent
7 of all cable subscribers are currently getting cable modem
8 service.

9 There's about 48-million homes that are currently
10 passed or the penetration of the modems is about 5 percent
11 of the households that are passed by cable -- where the
12 cable service is actually available.

13 Today, about 50 percent of the cable systems are
14 two-way cableble (phonetic), and they're projecting --
15 strategies group is projecting that by 2001 90 percent of
16 the cable systems will be two-way cable, which means then
17 it'll be relatively easy for them to offer cable modem
18 service, should they want to do that.

19 DSL service is about 500,000 DSL residential
20 subscribers today. About 57 percent of the central offices
21 are capable of offering digital and private line services
22 and actually have DSLAMs in them, which means that a much,
23 much larger share of the number of lines actually make that
24 available.

25 And in terms of PC internet users, about

1 50 percent of the people are using PCs from the home and
2 about 90 percent of those PC users are on-line, according to
3 Harrison, are active.

4 And on another consumer survey there, when they
5 surveyed internet access, it looks like something like
6 6 percent of the folks that are on the internet are having
7 access to broadband.

8 Next slide.

9 So in terms of availability, especially from the
10 Academy, there's lots and lots of problems. There's trade
11 press, industry statistics, analyst report data, is the best
12 that's available, in terms of understanding what really is
13 available right now and where.

14 But there's wide variation in the estimates.
15 There's typically a lack of explanation in the
16 methodologies. You capture these statistics in the trade
17 press, you don't really know where they're reported.

18 When you compare and even some times from
19 allegedly the same report, some \$10,000 report that as
20 academics may not have, they don't necessarily even agree.

21 And there's not a time series, because the way in
22 which things are being defined and tracked over time is
23 changing all the time.

24 Next slide.

25 In terms of the state of the competition, what we

1 need to look at is how many facilities providers and
2 services are being offered?

3 Today you see a lot of competitive local exchange
4 carriers offering modem service on the basic ILEC
5 facilities. But you're only now beginning to see
6 communities where both DSL service and cable modem service
7 is available from two alternative physical sources, and
8 perhaps quite a number of suppliers.

9 There are a lot of communities in Massachusetts
10 now where there's more than 10, 20 suppliers you can get
11 broadband service from, which would appear to be very, very
12 competitive.

13 But you should be aware that when we talk about
14 broadband, it's very, very local. A lot of the work now
15 being internet access was able to show very, very high rates
16 of competition because you can almost look anywhere in the
17 United States and it's a local phone call to get to a
18 dial-up.

19 Local service, it's really different.

20 And the chart, the picture of Manhattan, is much
21 more of a story. And if you were to look at that, even at
22 the housing stock level, you'd find similar replication of
23 that sort of picture.

24 There's a wide variety of service offerings.
25 There's a whole bunch of issues that are going to become

1 important over time.

2 Broadband, the deployments are progressing very,
3 very rapidly. So if we're going to sit there and say, oh,
4 my god, there's a digital divide, yes, it appears there is
5 in the data, taken with snapshot at this point time.

6 But I think it makes a lot of sense that the
7 services are being deployed first in the communities where
8 they are being deployed.

9 Will there be areas where the service is still to
10 come, and it'll probably take public policy to make sure
11 they come there. Yes, I think that is definitely going to
12 be the case.

13 Is it going to be anything like what it looks like
14 today? No, I don't think that's going to be the case.

15 I think the way in which services are being
16 deployed, the more interesting issue is going forward from a
17 policy point of view and an academic research point of view,
18 are less, can you get service if you want it; and more, what
19 is the quality of the service, if you get it, and do you
20 really have legitimate choices amongst carriers who are
21 really competing aggressively?

22 And with that, I must be out of time, so I'll
23 stop.

24 (Pause.)

25 DOCTOR VICTOR GLASS: Thanks very much, Brett, for

1 inviting me to speak here.

2 My name is Victor Glass, and I represent the
3 National Exchange Carrier Association, and I'll get into who
4 that company is in a minute.

5 But the theme that I want to talk about is
6 broadband is coming to rural America and you'll hear about
7 similar constraints and similar progress that you heard from
8 the other speakers, but focused more on rural America.

9 Okay. National Exchange Carrier Association, most
10 of you, I presume, have not heard of our organization,
11 supports over 1100 small telephone companies, primarily
12 rural telephone companies. We set their access rates or
13 their wholesale rates that they charge primarily
14 long-distance carriers for completing long-distance calls
15 over local networks. We're also in tariffing DSL broadband
16 services.

17 The challenge for us in setting rates and for
18 policy makers is that rural America is not only different
19 from non-rural America, but world telephone companies are
20 very different from each other.

21 And we supply this data to the World Task Force,
22 where if you look at the bottom of the table -- I don't know
23 if people behind the pylon and way back there can see it,
24 but basically it -- if you want to look at averages, and
25 averages are very deceptive, the lines per square mile in

1 rural telephone company areas is 19 lines per square mile --
2 quite a bit lower than what David Gabel was talking about
3 for getting DSL service -- versus an average of 127 lines
4 per square mile in non-rural telephone company areas,
5 serving areas.

6 However, if you look at the minimum and max in the
7 rural areas, there are some telephone companies out there
8 that have far less than one person -- far fewer than on
9 person per square mile versus one rural telephone company
10 that has over 407 lines per square mile. Not exactly what
11 you would consider a rural serving area.

12 Okay, let's go on.

13 Now, we've been looking at the potential for
14 rolling out broadband service, DSL service, in the rural
15 study areas that we serve, and we found that if you look at
16 it, 45 percent of the lines in the rural America that we
17 serve, the customers are within 13 kilo feet, 13,000 feet of
18 a switching point. A central office or remote switch. And
19 those are prime candidates for DSL service.

20 There are 46 percent of the lines that are between
21 13 kilo feet and 34 kilo feet or about 5 miles from a
22 switching point, and we found that there is SDSL service.
23 For example, Paradine (phonetic), has a service that can
24 reach those customers with the speeds of about 786 kilobits
25 per second. So there's a product out there for that group

1 of customers.

2 And finally there are 7 percent of the lines right
3 now that are greater than basically 5 miles from a switching
4 point in the rural areas. And if you're willing to accept a
5 speed of about 144 kilobits per second, there is IDSL and
6 ISDN, which can serve those customers, and providing them
7 faster speeds.

8 Anyway, this assumes that the lines, the network
9 out there, is actually conditioned so that you can actually
10 provide the service. There are other technical problems.
11 But the point is that there are services out there to reach
12 these customers.

13 Next slide.

14 From our access market survey -- we survey our
15 pool members, our clients every two years -- we found that
16 rural telephone companies are rapidly deploying a broadband
17 network, a data intensive network.

18 For example, we found that 151 companies in
19 42 states and 98 additional companies are in the planning
20 stages to roll out DSL in their company serving areas or
21 study areas.

22 They can potentially serve 1.8-million customers,
23 and we, as a comparison, the 1100 study areas actually serve
24 6-million customers. So there's a rapid rollout of DSL
25 service. Not to every customer in those areas, but these